

3.3 Slopes of Lines

$$\text{Slope} = \frac{\text{rise}}{\text{run}} = \frac{y_2 - y_1}{x_2 - x_1}$$

Δy
 Δx

change

Find the slope.

1. A(1, 3) B(-2, -3)

$$m = 2$$

2. C(8, -2) D(5, 3)

$$m = -\frac{5}{3}$$

3. E(8, 1) F(4, 1)

$m = 0$
horizontal
lines
ex: $y = 1$
Zero

4. G(-2, 1) H(-2, -5)

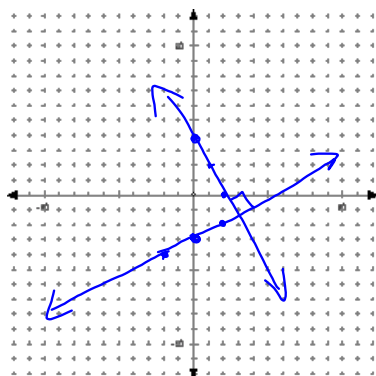
no slope
undefined
vertical
ex: $x = -2$
No slope

Parallel lines have the same slopePerpendicular lines have opposite reciprocal slopes

ex $m = -\frac{5}{3}$

$m = \frac{3}{5}$

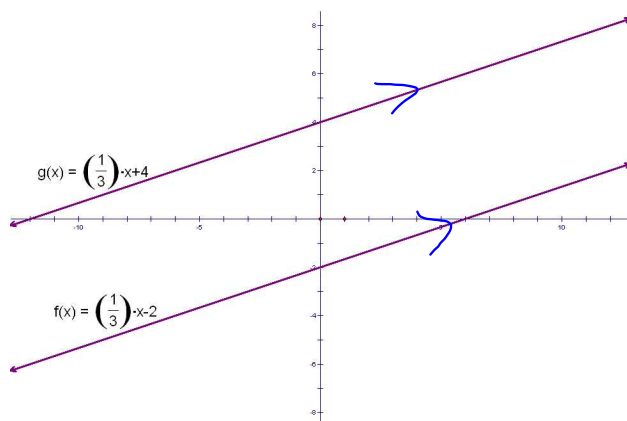
$$y = \frac{1}{2}x - 3$$



$$y = -2x + 4$$

Give an equation of a line \perp to the line above

Graph the two equations listed.



3-4 Equations of lines

Slope-intercept form $y = mx + b$

Point-slope form $y - y_1 = m(x - x_1)$

Standard form $Ax + By = C$

A, B, & C are integers, A is positive,
A, B, & C have a GCF of 1

$$\begin{aligned} 2x + 4y &= 6 \\ \underline{x + 2y} &= 3 \end{aligned}$$

Write the equation of the line given the following information.

1. $(0, 8)$ $m = 3$

$$y = mx + b$$

$$y = 3x + 8$$

 $(0, b)$ 2. $(-3, -6)$ $m = 2$

$$y = mx + b$$

$$y = 2x + b$$

$$-6 = 2(-3) + b$$

$$0 = b$$

$$y = 2x$$

3. $(6, -3)$ $(8, -9)$

$$m = \frac{-9 - (-3)}{8 - 6} = \frac{-6}{2} = -3$$

$$y = -3x + b$$

$$-3 = -3(6) + b$$

$$15 = b$$

$$y = -3x + 15$$

Std. Form

$$3x + y = 15$$

$$(6, -3)$$

Point-Slope

$$y - y_1 = m(x - x_1)$$

$$y + 3 = -3(x - 6)$$

4. Write the equation of the line \perp to $2x + y = 5$ and passes through $(1, -7)$.

$$y = -2x + 5$$

$$m = -2$$

$$m = +\frac{1}{2}$$

 $(1, -7)$

$$y = \frac{1}{2}x + b$$

$$-7 = \frac{1}{2}(1) + b$$

$$-7\frac{1}{2} = b$$

$$y = \frac{1}{2}x - 7\frac{1}{2}$$

$$- \left[\frac{1}{2}x + y = -7\frac{1}{2} \right]$$

$$x - 2y = 15$$

Std Form

5. Write the equation of the line \parallel to $3y - x = 4$ and passes through $(3, 10)$.

$$3y = x + 4$$

$$y = \frac{1}{3}x + \frac{4}{3}$$

$$m = \frac{1}{3}$$

$$m = \frac{1}{3} \quad (3, 10)$$

$$y = \frac{1}{3}x + 9$$

6. Write the equation of the line perpendicular to the line containing (4, 3) (4, 8) and passing through (2, -9).

$$m = \frac{5}{0}$$

undefined
vertical

horizontal

$$y = -9$$

HW p142-143 #s 15-23 odd, 28, 31, 33, 36
P148-149 #s 19, 22, 39, 41, 43, 44

Change

HW p142-143 #s 19-23 odd, 28, 31, 33
P148-149 #s 19, 22, 39, 41, 43